

Mountain Pine Beetle and Lodgepole Pine: Fuel for Fire???

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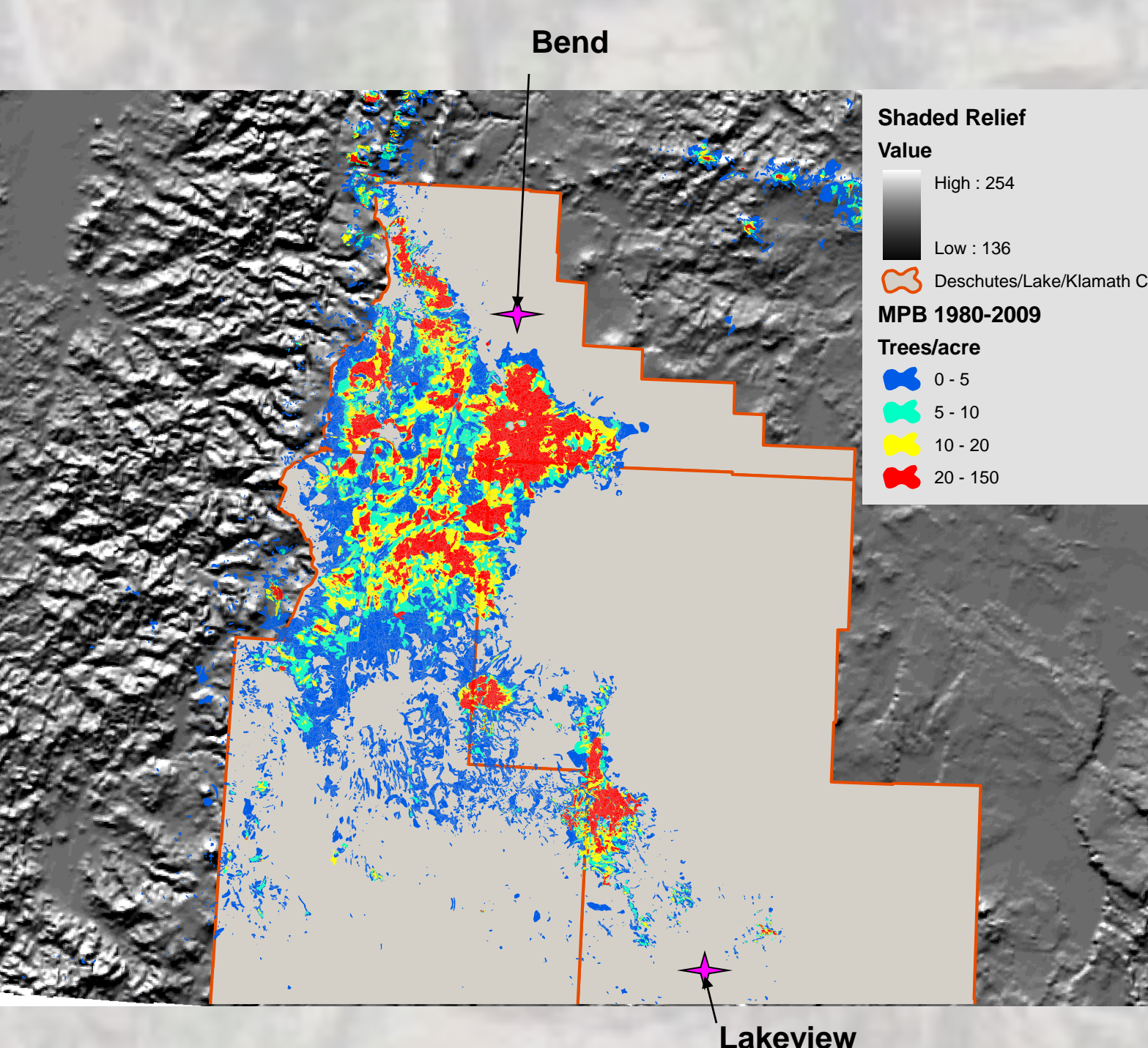
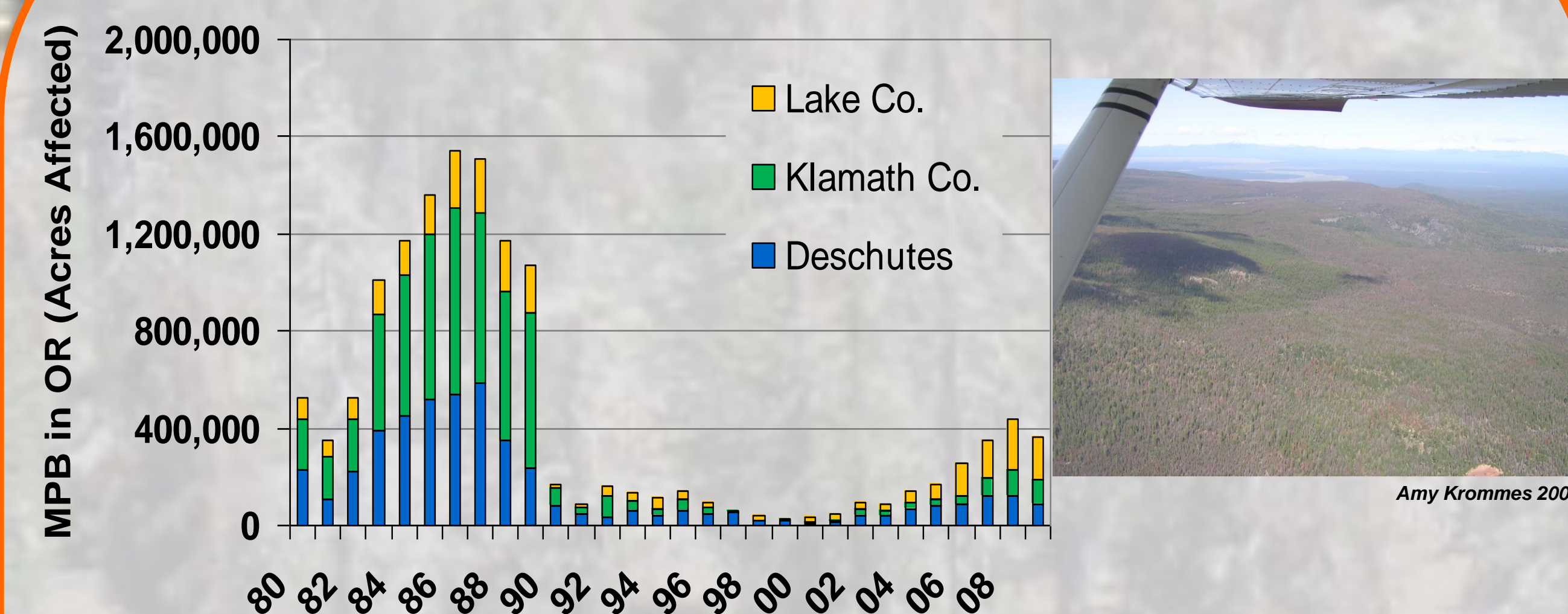
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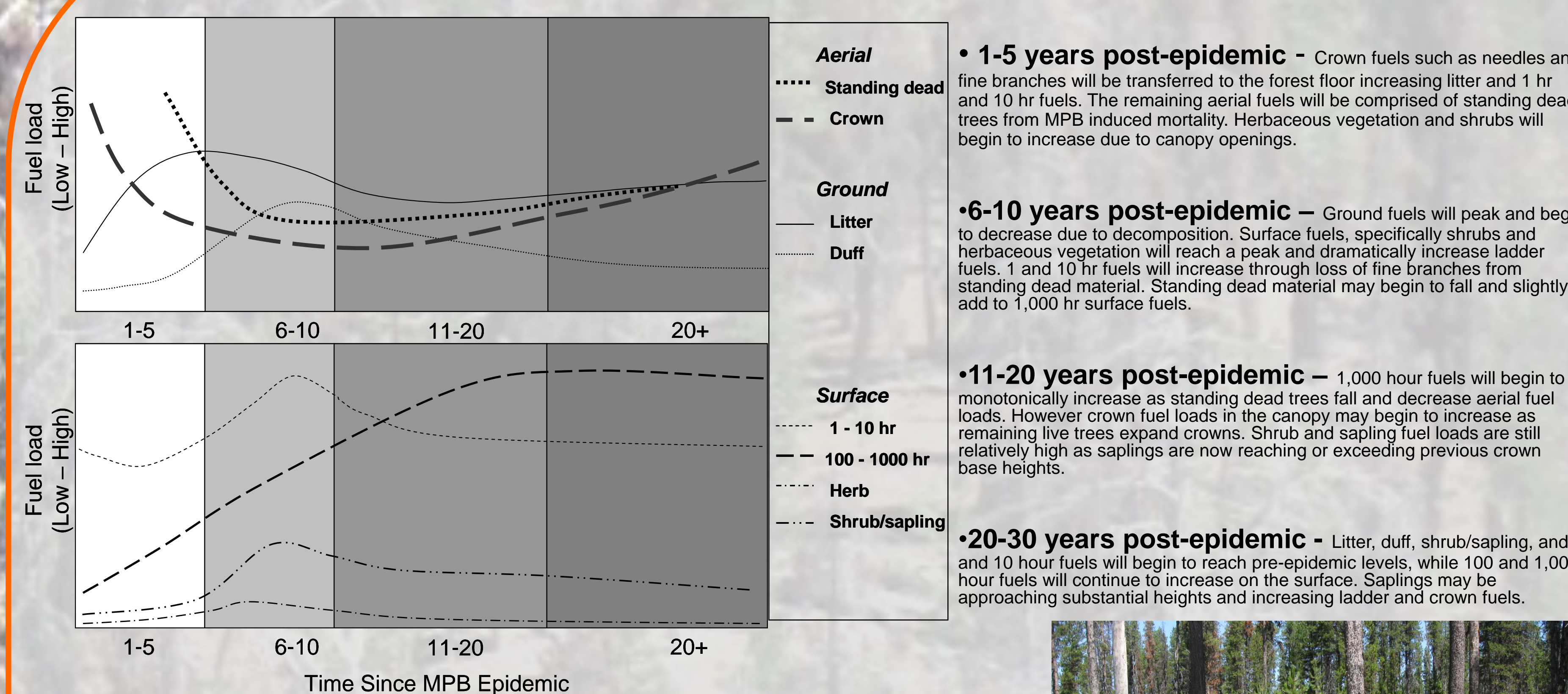
This project is funded by JFSP to investigate the temporal dynamics of fuels and fire behavior following mountain pine beetle epidemics in south-central Oregon Lodgepole pine forests. Data collection will begin in summer of 2010 and continue through 2011. The study will address 2 main questions:

1. How do fuel profiles in Lodgepole pine forests change over time in response to mountain pine beetle epidemics?
2. What are the effects of mountain pine beetle epidemics and changes in fuels on fire behavior over time?

Mountain pine beetle (*Dendroctonus ponderosae*)



Hypothetical fuel profiles over time



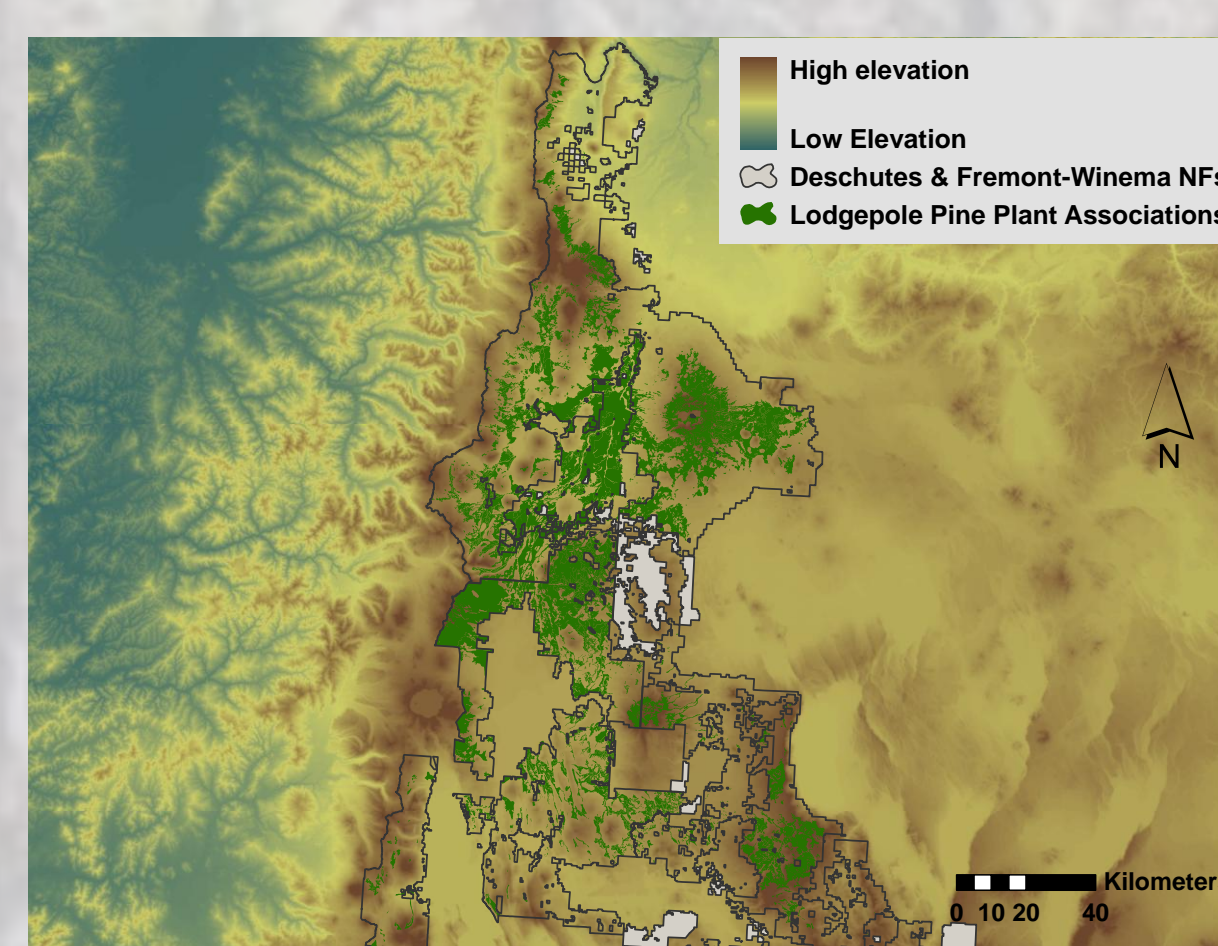
Potential Fire Behavior

- **1-5 years post-epidemic** — Rate of surface fire spread will be elevated due to increases in fine surface fuels. Potential for active crown fires will be high due to decreased foliar moisture content.
- **6-10 years post-epidemic** — Rate of surface fire spread will remain high due to remaining fine fuels and increases in understory vegetation. Total heat release should increase from a slight increase in 100 and 1,000 hr fuels. Potential for active crown fire should substantially decrease from reduction in crown bulk density.
- **11-20 years post-epidemic** — Rate of surface fire spread will begin to decrease with lower fine fuel loads. Ladder fuels will increase with increased shrub and sapling fuel loads, and may begin to increase crown fire potential if some live crown remains. Heat release should begin to increase due to standing dead trees falling and adding to 1,000 hr fuel loads.
- **20-30 years post-epidemic** — The large flux of 1,000 hr fuels will increase total heat release, but rate of spread and fire-line intensity should continue to be low. As regeneration and continued dominance of shrubs occurs, crown fire initiation and possible crown fire risk increases as crown fuels begin to reestablish in the upper canopy.



Relative fire risk and severity		Change	Change	Change
Fuel Model	Decrease	Change	Change	Change
Canopy Cover	Decrease	Decrease	Increase	Increase
Canopy Base Height	Increase	Increase	Decrease	Decrease
Canopy Bulk Density	Decrease	Decrease	Increase	Increase
Foliar Moisture Content	Decrease	Decrease	Decrease	Decrease
Pre beetle		1 year	2+ years	Needles off
		Needles on	Treefall	Regeneration

Study Area

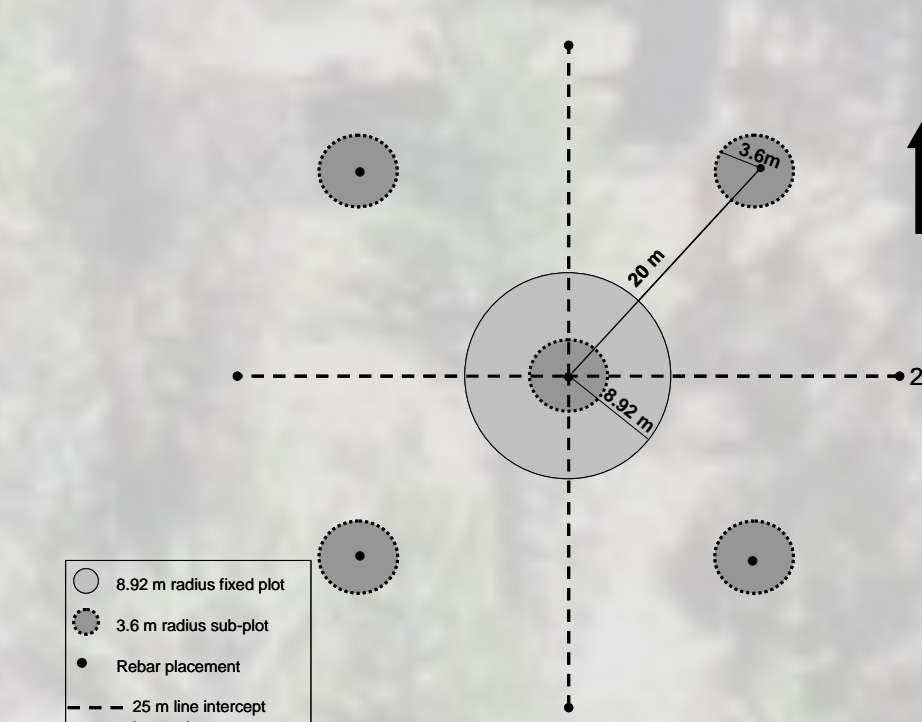


Chronosequence Approach

We will sample fuels and stand structure throughout the study area using a chronosequence (substituting space for time) of time since initiation of MPB epidemic from 1980 to 2009. Aerial Detection Survey (ADS) data will be used to locate areas of MPB epidemics over time across a productivity gradient (Plant Associations) within the study area.

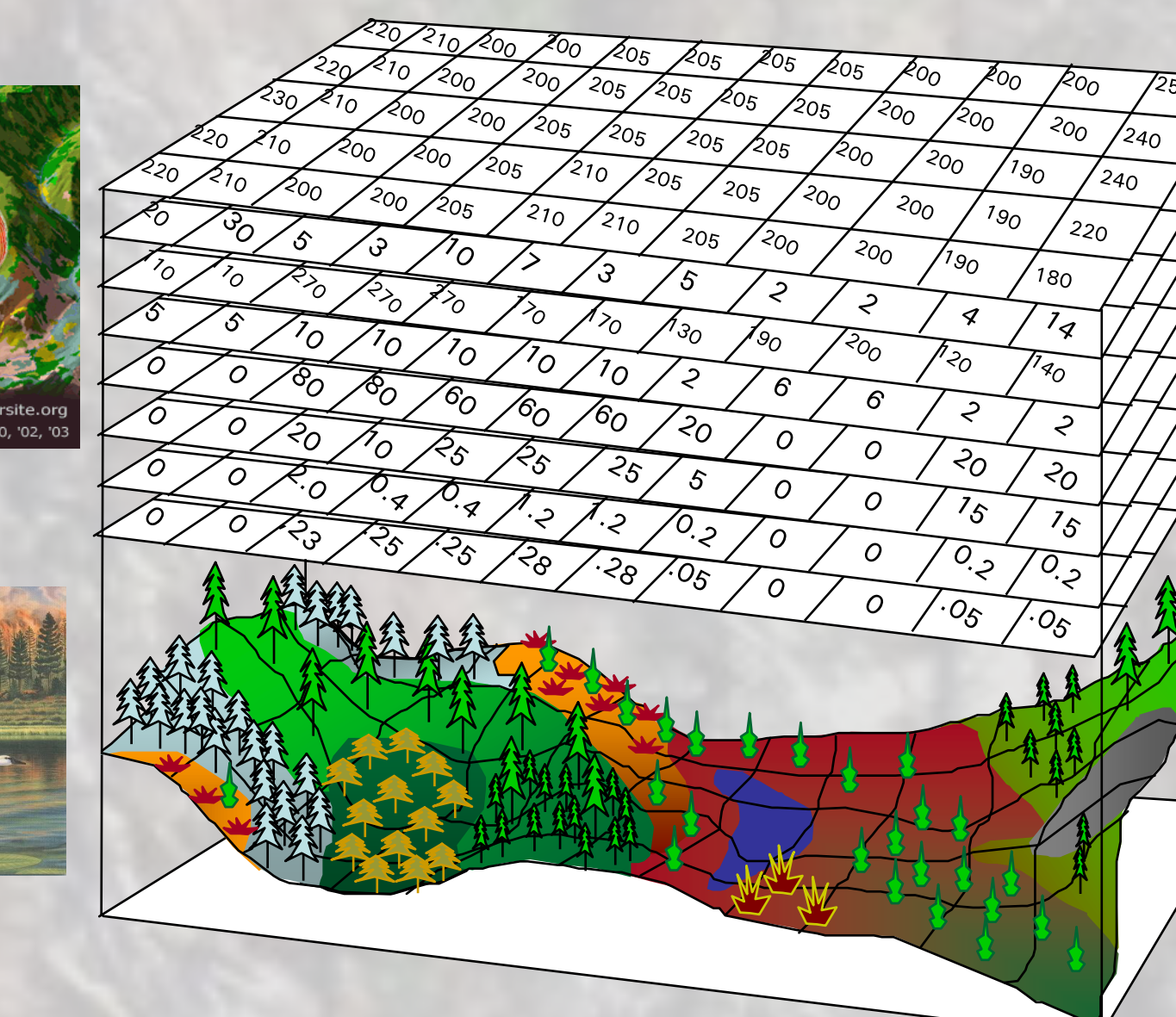
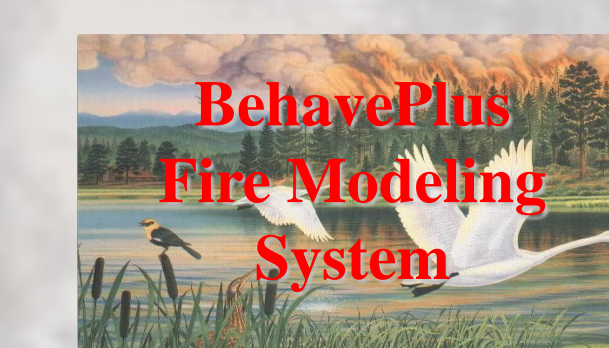
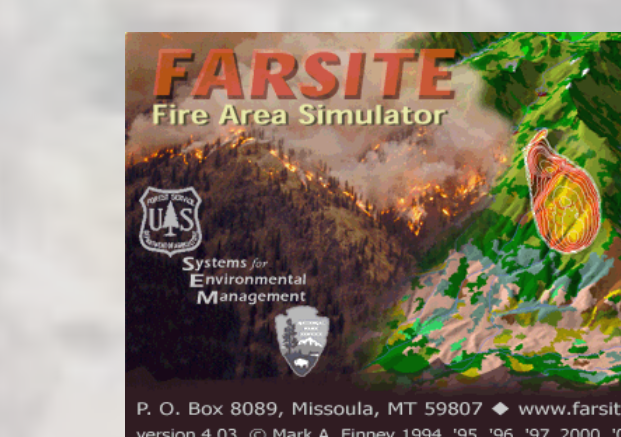
Study and Sampling Design

Fuels and Stand Structure Data



- 1, 10, 100, and 1,000 hr fuels
- Surface and Aerial
- Litter and Duff Depth
- Overstory Structure
- Tree & snag diameter & height
- Canopy Base Height
- Tree, shrub, & herbaceous cover
- Dwarf mistletoe ratings

Fire Behavior Modeling



Elevation Slope Aspect Fuel Model Canopy Cover Canopy Height Crown Base Height Crown Bulk Density

